Energy and Fuels 2017 vol.31 N10, pages 11253-11257

Catalytic Combustion of Heavy Oil in the Presence of Manganese-Based Submicroparticles in a Quartz Porous Medium

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Abstract

© 2017 American Chemical Society. We synthesized manganese oxide(II) submicroparticles stabilized with oleic acid and used them as oil-dispersible catalyst precursor promoting a heavy oil oxidation process. Size, morphological properties, as well as composition of the catalyst were studied in depth by X-ray phase diffraction analysis, thermogravimetric-mass spectrometry analysis, scanning electron microscopy, energy dispersive X-ray analysis, and nitrogen adsorption measurements. We applied nonisothermal kinetic analysis coupled with an isoconversional approach to study the influence of catalyst on the combustion process and showed that Mn-based submicroparticles accelerate predominantly the high-temperature oxidation process.

http://dx.doi.org/10.1021/acs.energyfuels.7b01856

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